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Abstract

RAPSODIE

(Commissariat à l'Energie Atomique, France)

Rapsodie, the first fast neutron reactor to be constructed in France by an association formed by Euratom and the CEA, fulfills the following three aims :

- It will serve first of all as an experimental reactor for the investigation of its behaviour under static and dynamic conditions.

- The information obtained from its construction and functioning will serve to develop the technology of future fast neutron industrial reactors.

- Its fast neutron flux will be sufficiently intense for the irradiation tests of fuel elements for subsequent fast neutron reactors.

Since Rapsodie has already been described, we will give only a brief account of it, underlining the particularily interesting points and the recent changes in the programme. We will mention the following points :

- its principle neutron and thermal characteristics
- the fuel and breeding assemblys
- the reactor block and cooling circuits
- the principles and modes of operating on the control and safety of the reactor.

The construction of the reactor was preceeded by the construction of full-scale models of its essential parts, which include notably :

- a complete 10 MW sodium circuit, a prototype of the two circuits which equip the reactor.

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- a model of the reactor block (tank, upper shutter, internal structure of the core and of the cover), furnished with a special sodium circuit in order to be able to carry out tests on endurance and thermal shocks.
- prototypes of various elements of the reactor (mechanism of the control rods, equipment for handling the assemblys, etc ...).
- the hood to be used in the loading and unloading of the assemblys in the reactors was temporarily mounted beside the model of the tank in order to adjust their functioning together under conditions identical with those of the reactor.

Testing began on these various models in 1962, and is continuing. A description of the results of these tests and the information gathered from them will be presented in this report.

A number of interesting studies were carried out on the safety of Rapsodie, and in particular scale models (1/3 and 1/10) were used to estimate the damage caused by the theoretical maximum nuclear accident.

The construction of the reactor was started in the autum of 1961. The industrial architects are the Groupement Atomique Alsacienne Atlantique (G.AAA). A brief outline of the current situation in the construction will be given.